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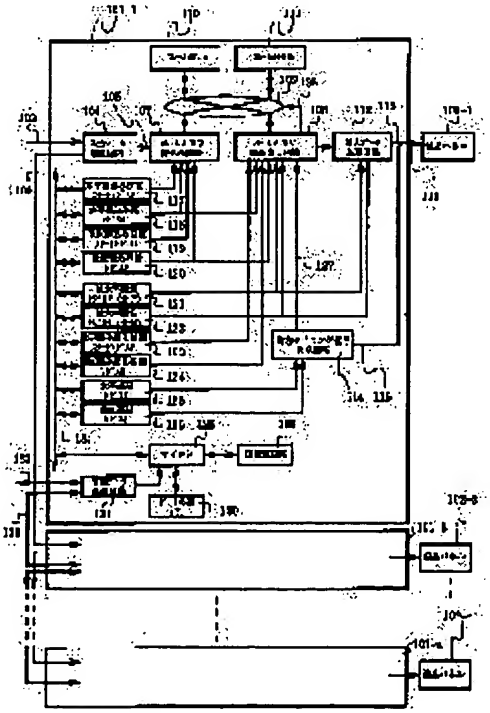
## (54) DISPLAY CONTROLLER FOR MULTI-DISPLAY DEVICE, DISPLAY DEVICE AND MULTI-DISPLAY DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a display controller, a display device, a multi-display device and a multi-display system realizing an expansion display, a high definition display with inexpensive constitution in a multi-display constituted of plural liquid crystal displays.

SOLUTION: A circuit setting a horizontal data fetch start position, horizontal data fetch width, a vertical data fetch start position, vertical data fetch width and an expansion rate, the circuit storing the display data and the circuit setting an ID number of liquid crystal panels 102 (1-n) are provided in multi-display circuits 101 (1-n) answering to respective liquid crystal panels 102-1 to 102-n. Thus, by that respective multi-display circuits 101-1 to 101-n fetch/display the display data of the same or different areas, a colorful display image is obtained.



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DRAWINGS

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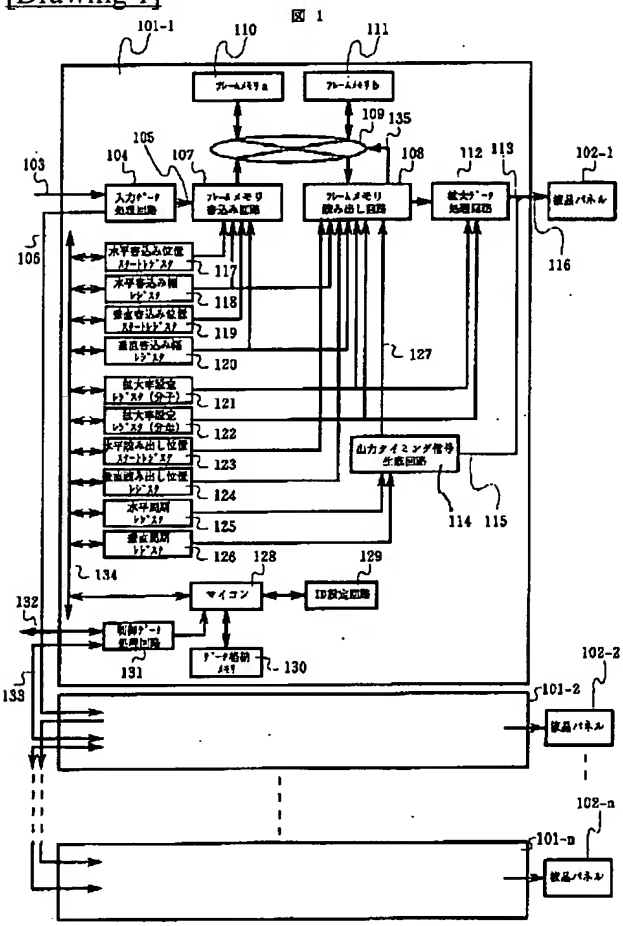
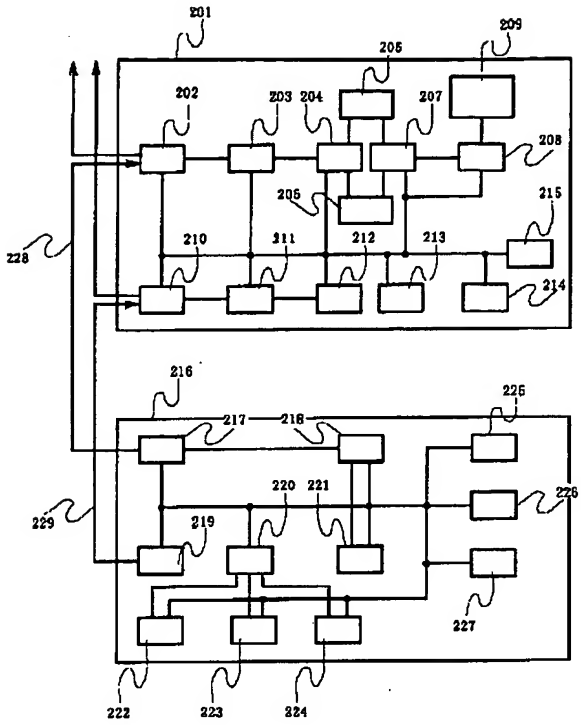
[Drawing 1]



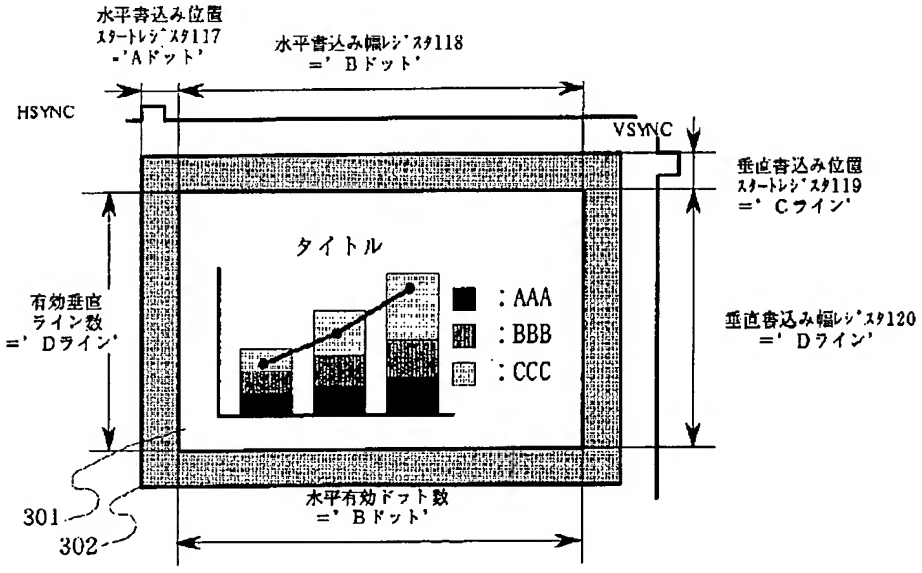

[Drawing 2]

図 2



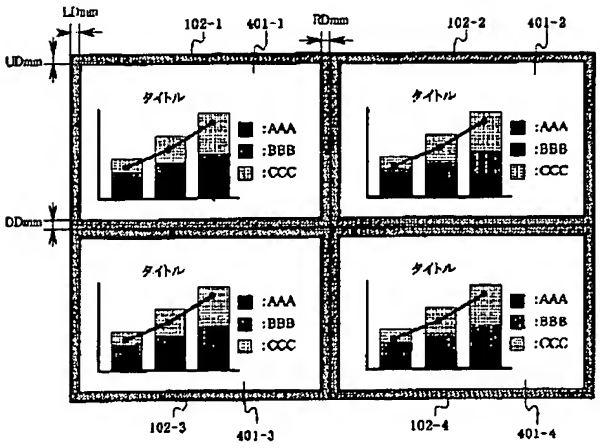

[Drawing 3]

図 3



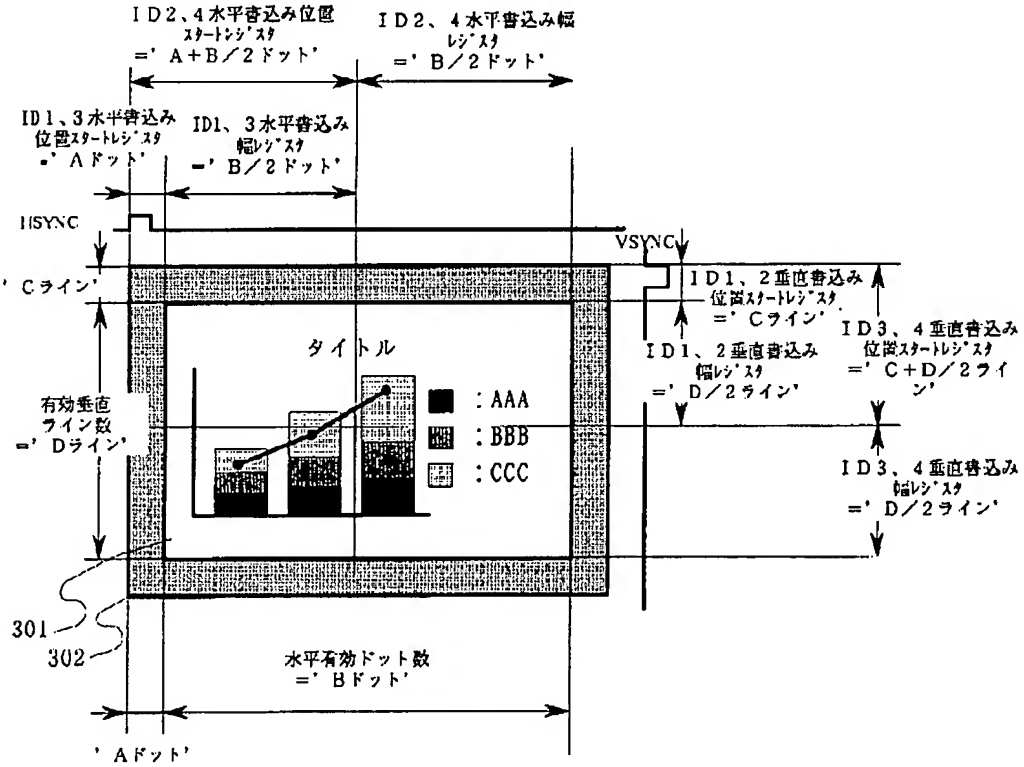

[Drawing 4]

図 4



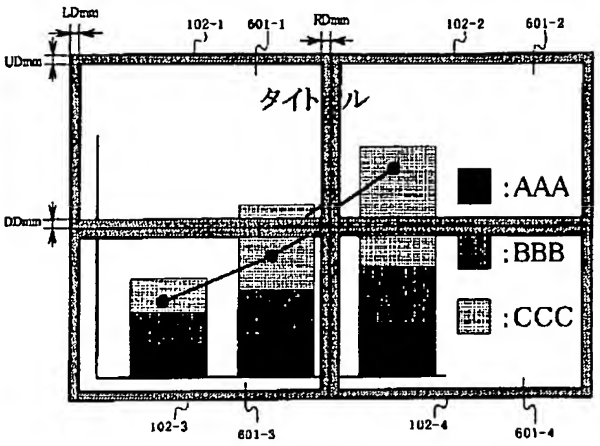

[Drawing 5]

図 5



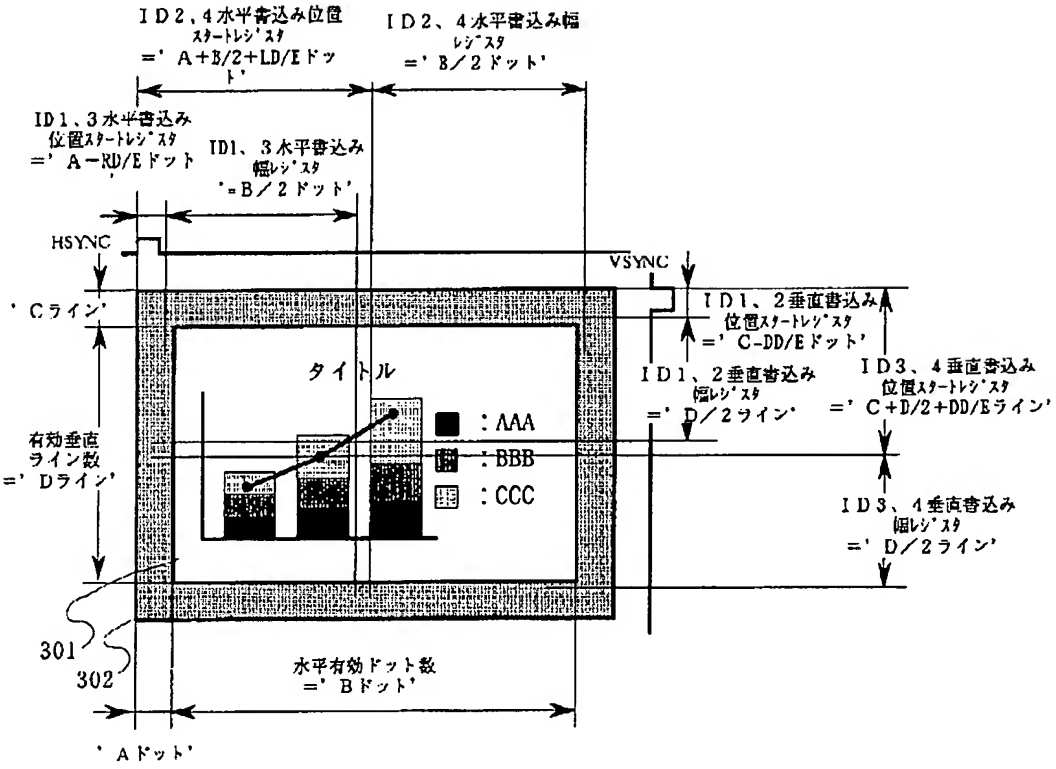

[Drawing 6]

図6



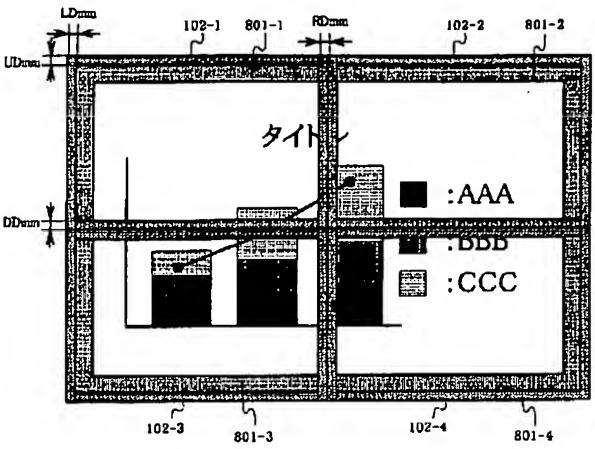

[Drawing 7]

図 7



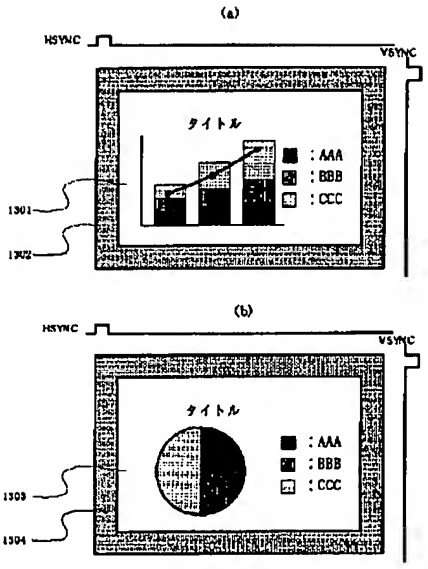

[Drawing 8]

図 8



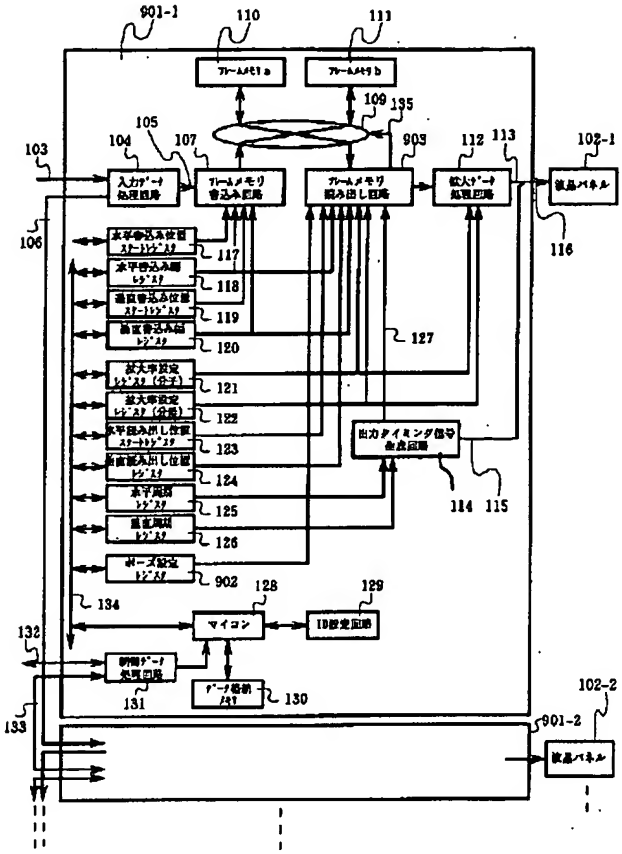

[Drawing 13]

図 13



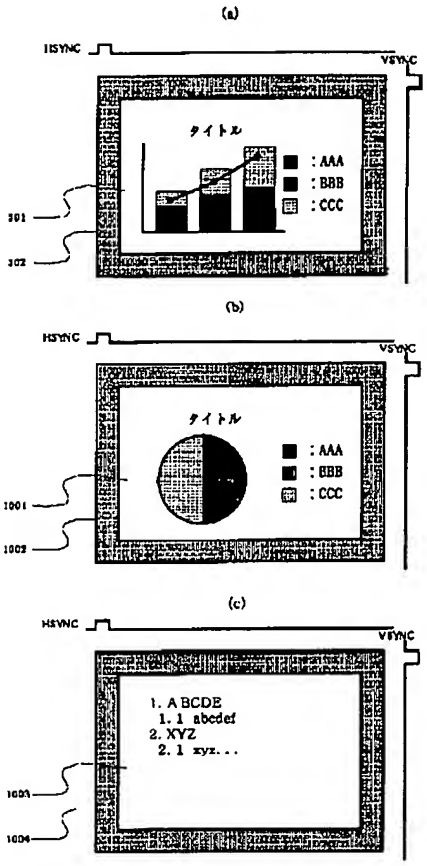

[Drawing 9]

図 9



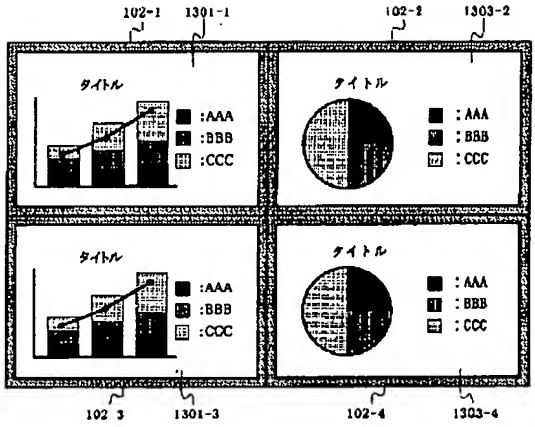

[Drawing 10]

図 10



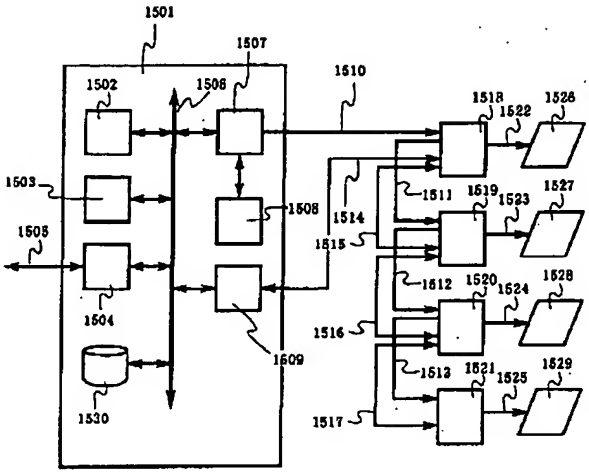

[Drawing 14]

図 14



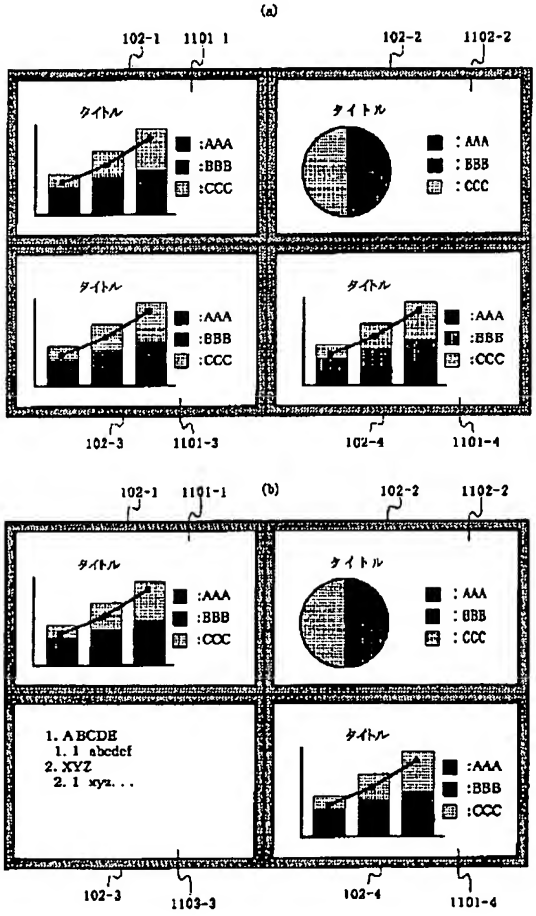

[Drawing 15]

図 15



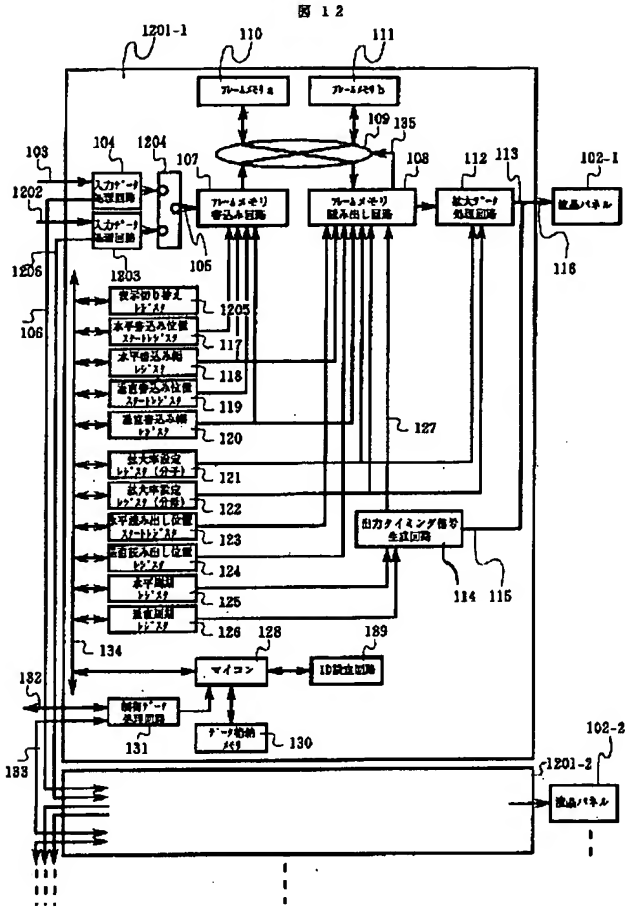

[Drawing 11]

図 11



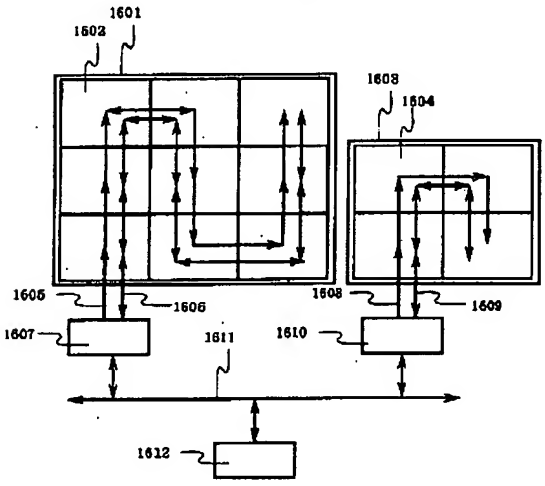

[Drawing 12]

図 1 2



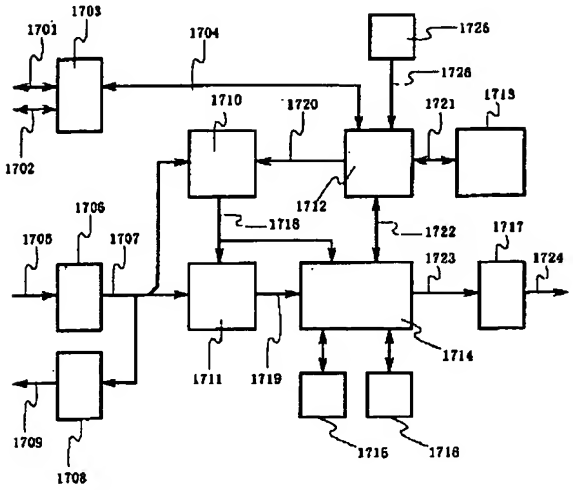

[Drawing 16]

図 16



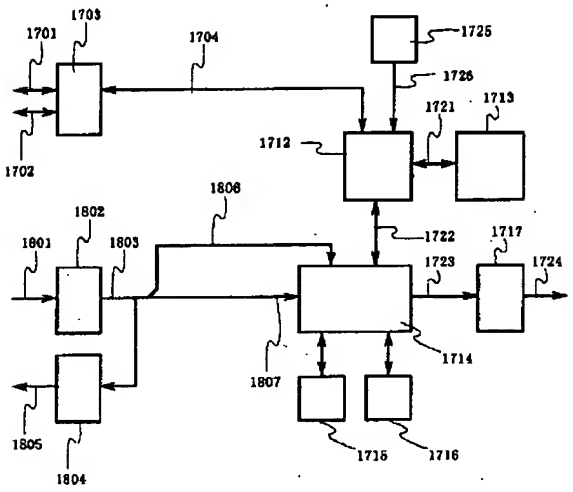

[Drawing 17]

図 17



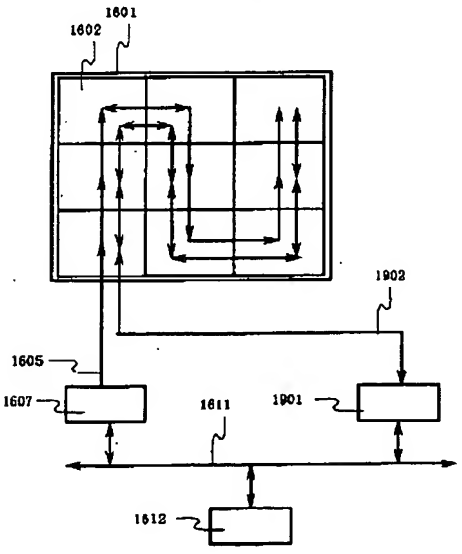

[Drawing 18]

図 18



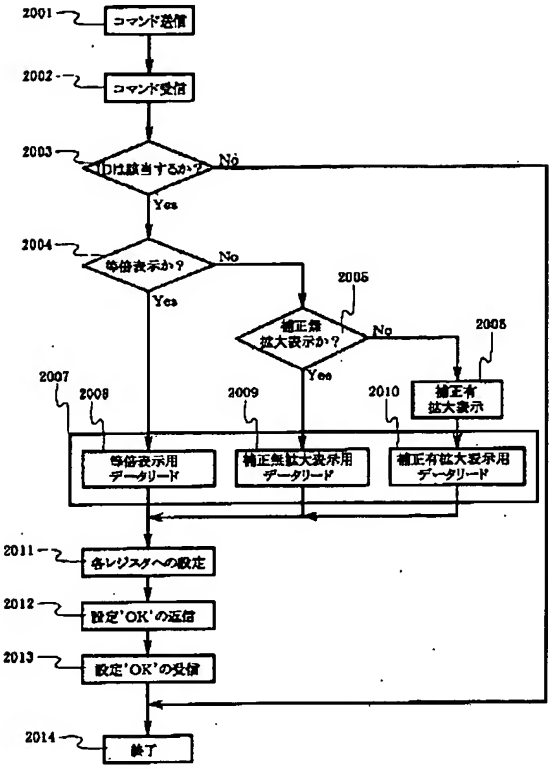

[Drawing 19]

図 19



[Drawing 20]

図 20

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Field of the Invention] With respect to the multi-display constituted from an indicating equipment of two or more sheets, especially, this invention is a cheap configuration and relates to the display control, the multi-display equipment, and the multi-display system which realize an enlarged display and a highly minute display.
[0002]
[Description of the Prior Art] A configuration which is indicated by JP,10-187109,A "a multi-display system" is taken about the conventional multi-display system. This conventional multi-display system is explained using drawing 2 .
[0003] In drawing 2 , 201 is the monitor section, 202 is the image input section, 203 is an A/D converter, 204 is the storage selection section, 205 is image memory a, 206 is image memory b, 207 is change operation part, 208 is a D/A converter, 209 is a display, 210 is a control signal receive section, 211 is the decoding section, 212 is reception-control signal memory, 213 is ID setting-out section, 214 is monitor system memory, and 215 is a monitor control section.
[0004] 216 is the image transmitting section, 217 is the picture signal generating section, 219 is the control signal sending-out section, 220 is the control signal composition section, 221 is the synchronizing section, 222 is the monitor ID registration section, 223 is the program code generating section, 224 is the frame number generating section, 225 is a system memory, 226 is a control section, and 227 is monitor control program memory.
[0005] 228 is a picture signal circuit and 229 is a control signal circuit.
[0006] Next, actuation of the conventional example given in drawing 2 is explained.
[0007] The picture signal generating section 217 of the image transmitting section 216 edits the video signal of a camera, VTR, PC, etc., etc. beforehand, makes all the image data that carries out display service in two or more monitor sections the analog picture signal of the continuous static image, and sends it out to the picture signal circuit 228 from the image sending-out section 217. Moreover, each data of the monitor ID registration section 222, the program code generating section 223, the frame number generating section 224 of an image, and the monitor control program memory 227 is compounded in the control signal composition section 220 for control of the monitor section 201, and it is the synchronizing section 221, and this compound digital control signal is synchronized with the image data outputted from the image sending-out section 217, and is transmitted to the monitor section 201.
[0008] The image data transmitted operates according to the control signal transmitted from the control signal circuit 229 from a picture signal circuit 228. Image data is changed into digital image data by A/D converter 203, and is memorized through the storage selection circuitry 204 in an image memory a205 or an image memory b206. Reading appearance of the memorized digital image data is carried out through the change operation part 207, and it is displayed on a display 209 through D/A converter 208.
[0009] Thus, in the form which synchronized with the image data outputted from the image transmitting

section 216, the display in two or more monitor sections 201 from transmitting the frame number of this image data, ID of the monitor section 201 to display, etc. as a control signal was attained.
[0010]
[Problem(s) to be Solved by the Invention] In the conventional multi-display system, since the frame number and the ID number needed to be added to each image data, only the static image was able to be transmitted.
[0011] Moreover, since the ID number of the indicating equipment which corresponds for every indicative data needed to be attached, the complicated activity was needed when processing the indicative data.
[0012] Furthermore, since a means to display one indicative data continuously was not formed in an indicating-equipment side again ranging over two or more indicating equipments, it is the distribution side of an indicative data and there was the need of doing the activity.
[0013] In the multi-display constituted from two or more liquid crystal displays, the object of this invention is a cheap configuration and is to offer the display control which realizes an enlarged display and a highly minute display, an indicating equipment, multi-display equipment, multi-display equipment, and a multi-display system.
[0014]
[Means for Solving the Problem] In order to attain the above-mentioned object, this invention has the following configurations.
[0015] It is the configuration of having the input-data processing section into which it is the display control which controls an indicating equipment, and an indicative data is inputted, the control data processing section into which control data including the information which specifies the sector-display data of said indicative data is inputted, the data-output section which outputs said inputted indicative data to said indicating equipment, and the control section which control said output section according to said control data to output said sector-display data to said indicating equipment.
[0016] Moreover, it has the storage section with possible said control section holding discernment data in the above-mentioned display control, said information included in the discernment data which said storage section holds, and said control data can be answered, and it can also consider as the configuration characterized by controlling said output section to output said sector display data to said display.
[0017] Furthermore, in said display control, discernment data are contained in said control data, and said control section can also be considered as the configuration which controls said output section to output said sector display data to said display, when the discernment data which said storage section holds, and the control data contained in said control data are in agreement.
[0018] Moreover, it is the display control which controls an indicating equipment, and is good also as a configuration which has two or more input data processing sections into which an indicative data is inputted, the control data processing section into which control data is inputted, the indicative-data change circuit which chooses any one of said two or more input data processing sections according to said control data, and the output section which outputs said indicative data chosen in said indicative-data change circuit to said indicating equipment.
[0019] Moreover, the input data processing section into which it is the display control which controls an indicating equipment, and an indicative data is inputted, It has the control data processing section into which control data is inputted, the output section which outputs said inputted indicative data, and the control section which controls said output section. Further said output section It has the indicative-data storage section which memorizes said inputted indicative data. Said control section So that the processing which memorizes said indicative data in said indicative-data storage section may be suspended, while having the storage section which can hold the instruction which suspends the input of an indicative data included in said control data and holding said instruction at said storage section The configuration characterized by controlling said output section is also considered.
[0020] Furthermore, the display which is one display in two or more displays put in order and arranged, and displays an image, It has the display and control section which outputs an indicative data to said

display. Said display and control section The input data processing section into which said indicative data is inputted, and the control data processing section into which control data is inputted, It has the storage section which can hold the data about where [ of two or more indicating equipments put in order and arranged ] this indicating equipment is arranged. When the data contained in the data held at said storage section and said inputted control data are in agreement, the configuration characterized by outputting said indicative data to said display is also included in this invention.

[0021] Moreover, the multi-display equipment which has the configuration characterized by to have the storage section which can hold the information which shows whether where it is located in said display [ each / of said display and control section ] corresponding to [ are multi-display equipment which has two or more displays put in order and arranged in the MxN train and each display and control section which controls the display of two or more of said displays, and ] this display and control section having arranged in the MxN train, and having arranged is also contained in this invention.

[0022] Furthermore, two or more displays put in order and arranged in the MxN train and each display and control section which controls the display of two or more of said displays, It has the control unit which sends control data including the information which shows each location of two or more displays which arranged in said MxN train to said display and control section in each, and have been arranged. Said control section in each The multi-display system characterized by having the storage section holding the information about the location which arranged in the MxN train of said display corresponding to each control section, and has been arranged is also considered.

[0023] It is the approach of displaying an image on two or more displays which arranged in the MxN train and have been arranged. Moreover, said two or more display each, The information which shows where [ where the equipment which controls the display of the image to said two or more displays was put in order by each, and said two or more displays of each were put in order by the MxN train / of arrangement ] it is located is held. The information which shows where [ of said arrangement ] it is located to the control data which said equipment to control transmits is transmitted to said two or more displays to each. The information which said displays of each receive the information which shows where [ of said the transmitted arrangement of said ] it is located, and shows where [ of said transmitted arrangement ] said display is located in each, when the information which shows where [ of the arrangement which this display holds ] it is located is compared and each information is in agreement, the approach of displaying the image characterized by the display of each this displaying the part of the arbitration of the image transmitted to this equipment is also included in this invention.

[0024] Furthermore, an input means to be the information processor connected with the indicating equipment which has two or more displays, and to input the data about arrangement of two or more of said displays, A storage means to hold the data about said inputted arrangement, and a decision means to determine the display position of the image to said two or more displays using the data about the arrangement memorized by said storage means, The information processor connected with the display which has two or more displays characterized by having a transmitting means to transmit the control data according to the display position determined by said decision means to said display is also considered.

[0025] Furthermore, are the display-control approach which controls the display to two or more displays, and the data about arrangement of two or more of said displays are inputted. Hold the data about said inputted arrangement and the display position of the image to said two or more displays is determined using the data about said held arrangement. The display-control approach which controls the display characterized by transmitting the control data according to said determined display position to said display is also included in this invention.

[0026]

[Embodiment of the Invention] From drawing 3 , drawing 8 is used for the drawing 1 list, and the first example of the multi-display of this invention is explained to it.

[0027] Drawing 1 is the block diagram of the multi-display of this invention. Drawing 3 is the display data format to input and the set point outline of each register at the time of a four liquid crystal panel configuration (the same display screen). Drawing 4 is an example of a display at the time of displaying

with each register set point given in drawing 3 . Drawing 5 is the display data format to input and the set point outline of each register at the time of a four liquid crystal panel configuration (with no display amendment). Drawing 6 is an example of a display at the time of displaying with each register set point given in drawing 5 (example of an enlarged display). Drawing 7 is the display data format to input and the set point outline of each register at the time of a four liquid crystal panel configuration (those with display amendment). Drawing 8 is an example of a display at the time of displaying with each register set point given in drawing 7 (example of an enlarged display).

[0028] Next, the detailed actuation is explained from drawing 1 .

[0029] In drawing 1 , 101 is a multi-display interface circuitry corresponding to the display control of this invention, and 102 is a liquid crystal panel corresponding to a display. Although this example explains using a liquid crystal panel, other indicating equipments, for example, CRT, and a plasma display are sufficient. -n shows the suffix character -1, -2, ...., that the multi-display interface circuitry 101 and the liquid crystal panel 102 are recognizing two or more (n pieces: n one or more integral values) existence.

[0030] In addition, in this application, the lot of the display control of 101 and the display of 102 may be called a display. Moreover, the equipment which combined said two or more indicating equipments is called multi-display equipment.

[0031] 103 is a display data bus which inputs an indicative data, 104 is an input data processing circuit, 105 is a display data bus which transmits an indicative data to the multi-display interface-circuitry 101 interior concerned, and 106 is a display data bus which transmits an indicative data to the multi-display interface circuitry 101 of the next step. 107 is a frame memory write-in control circuit, and 108 is a frame memory read-out control circuit. 109 is a data selector, 110 is a frame memory a, and 111 is a frame memory b. 112 is an amplification data-processing circuit and 113 is a display data bus to which the indicative data which an amplification data-processing circuit outputs is transmitted. 114 is an output timing signal generation circuit, and 115 is a control signal bus to which the synchronizing signal which is an output timing signal is transmitted. It is the liquid crystal panel interface signal with which the indicative data transmitted by the display data bus 113 and the control signal bus 115 of 116 and the synchronizing signal were compounded.

[0032] 117 is a level write-in location start register, 118 is a level write-in width-of-face register, 119 is a vertical write-in location start register, and 120 is a vertical write-in width-of-face register. It becomes possible to set up the field written in the inner frame memory a110 and frame memory b111 of an indicative data which are transmitted with the display data buses 103 and 105 with each of this register.

[0033] The molecule of a dilation ratio when 121 carries out an enlarged display and it makes a dilation ratio H/I (H and I are both forward integers): It is the register which sets up H and 122 is a register which sets up the denominator I of a dilation ratio. 123 is a level read-out location register, and 124 is a vertical read-out location register. In addition, in this example, the level write-in width of face 118 and the vertical write-in width of face 120 are applied about the value of level read-out width of face and vertical read-out width of face. The location at the time of reading the indicative data displayed on a liquid crystal panel 102 with each of this register from a frame memory a110 and a frame memory b111 can be set up.

[0034] 125 is a level period register, and 126 is a vertical period register and sets up the period of the Horizontal Synchronizing signal generated respectively in the output timing signal generation circuit 114, and the period of a Vertical Synchronizing signal. this setting out -- ****** -- the display to the liquid crystal panel 102 which has a timing specification is attained. In addition, the timing signal 127 which this output timing signal generation circuit 114 generates serves as criteria of actuation of the frame memory readout circuitry 108.

[0035] 128 is a microcomputer, 129 is ID setting-out circuit holding ID which is discernment data, 130 is the memory for data storage and 131 is a control data processing circuit. 132 is the control signal bus which performs an exchange of an external system and control data, and 133 is a control signal bus which connects with the multi-DISU pre interface circuitry 101 of the next step, and exchanges control data. 134 is the data bus of the multi-display interface-circuitry 101 interior, and exchanges the data

between a microcomputer 128 and each register. 135 is a signal which chooses the frame memory a110 or frame memory b111 which reads an indicative data.
[0036] Here, suppose that the configuration of 107, 108, 110, 111, and 112 used for data output is collectively called the data output section.
[0037] Moreover, suppose that each register of 117, 118, 119, 120, 121, 122, 123, 124, 125, and 126 used in order to control said data output section, the circuit of 114 and 129, a microcomputer 128, and the data storage memory 130 are collectively called a control section.
[0038] In drawing 1 , the indicative data transmitted from a system is transmitted through the display data bus 103. An indicative data is transmitted to the frame memory write-in circuit 107 which is the data output section through the input data processing circuit 104 and the display data bus 105. Here, a frame memory write-in circuit 107 has a level counter and a vertical counter, compares the value set as bottom of level write-in start location register [ which is a part of control section ] 117, level write-in width-of-face register 118, vertical write-in start location register 119, and vertical write-in width-of-face register 120 with the counter value which said level counter and a vertical counter output, determines the field which writes in a frame memory a110 or a frame memory b111, and carries out write-in actuation.
[0039] By changing the set point of the level write-in start location register 117, therefore, the frame memory a110 By being able to control the horizontal location written in a frame memory b111, and changing the set point of the level write-in width-of-face register 118, or the frame memory a110 By being able to control the horizontal width of face written in a frame memory b111, and changing the set point of the vertical write-in start location register 119, or the frame memory a110 Or the location of the perpendicularly it writes in a frame memory b111 can be controlled, and the width of face of a write-in perpendicular direction can be controlled by changing the set point of the vertical write-in width-of-face register 120 to a frame memory a110 or a frame memory b111.
[0040] Since it will begin to incorporate data from from before the indicative data (an effective indicative data is called hereafter) of the display-image part which was being planned starts if the horizontal read-out location start register 123 is made immobilization and the set point of the level write-in start location register 117 is decreased temporarily, the data incorporated in the excess as a result are displayed. That is, the display screen moves to right-hand side. Moreover, since it will begin to incorporate data after an effective indicative data starts if the set point of the level write-in start location register 117 is made to increase, data required as a result cannot be displayed, but since an effective indicative data will be displayed from the middle, the display screen will move to left-hand side.
[0041] Here, reading appearance of the indicative data written in the frame memory a110 or the frame memory b111 is carried out by the frame memory readout circuitry 108, and it is transmitted to a liquid crystal panel 102 through the amplification data-processing circuit 109. The reason for having formed the frame memory a110 and the frame memory b111 two kinds here is for carrying out actuation which reads the indicative data transmitted to a liquid crystal panel 102 from a frame memory b111 when writing in the indicative data inputted into a frame memory a110, and carrying out actuation which writes an input indicative data in a frame memory b111, when reading the indicative data transmitted to a liquid crystal panel 102 from a frame memory a110.
[0042] The microcomputer 128 of a control section develops the data in which the instruction included in the control data transmitted from a control bus 132 is stored by reception and the data storage memory 130 to each register indicated previously. This instruction is an instruction which specifies, the part, i.e., the sector display data, of an indicative data. That is, when the microcomputer 128 of a control section receives the instruction which specifies sector display data, it will develop data to each register so that the output section may output the sector display data.
[0043] Under the present circumstances, the ID number which is recognition data shown previously may be added to the instruction transmitted as control data from a control bus 132. This ID number will have the role which directs which display interface circuitry 101 is made to carry out the instruction concerned among each interface circuitry of a multi-display. In this case, a microcomputer 128 compares with the ID number incidental to the instruction ID set point set as ID setting-out circuit 129,

and the instruction concerned will be executed when in agreement.
[0044] Next, the case where it displays as the image shown in drawing 3 was shown in each screen of multi-display equipment with four indicating equipments in drawing 4 is explained concretely.
[0045] Drawing 3 is drawing having shown the display data format inputted from an external system, and the set point outline of each register at the time of a four liquid crystal panel configuration (the same display screen). 302 is an indicative data transmitted from a system, and 301 shows the field where an indicative data becomes effective before long, i.e., the field of an effective indicative data. HSYNC is a Horizontal Synchronizing signal and is a signal used as the criteria of the indicative data of one horizontal. VSYNC is a Vertical Synchronizing signal and is a signal used as the criteria of the indicative data of one frame.
[0046] In addition, in this example, a horizontal indicative data uses as a 'A dot' eye timing which becomes effective from the rising edge of an HSYNC signal, and makes 'B dots' the horizontal amount of effective indicative datas. Moreover, a vertical indicative data uses as 'C line' eye timing which becomes effective from the rising edge of a VSYNC signal, and makes 'D line' the vertical amount of effective indicative datas.
[0047] Drawing 4 is an example of a display at the time of displaying with each register set point given in drawing 3 . 102 is a liquid crystal panel and 401 is the viewing area of each liquid crystal panel 102.
[0048] In addition, in order to give explanation intelligible, the sign same about each amount of data as drawing 3 is used. That is, let 'B dots' and a vertical display service area be 'D lines' for the horizontal display service area of a liquid crystal panel 102.
[0049] Moreover, the height of the non-display field of the upper part of a liquid crystal panel 102 is set to 'UDmm', the height of the non-display field of the lower part of a liquid crystal panel 102 is set to 'DDmm', width of face of the non-display field of the right part of a liquid crystal panel 102 is set to 'LDmm', and width of face of the non-display field of the right part of a liquid crystal panel 102 is set to 'RDmm'.
[0050] Therefore, if the pixel pitch of the liquid crystal panel 102 of this example is set to 'Emm', the non-display field of the upper part of a liquid crystal panel 102 will serve as a 'UD/E dot', the non-display field of the lower part of a liquid crystal panel 102 will serve as a 'DD/E dot', the non-display field of the right part of a liquid crystal panel 102 will serve as a 'LD/E dot', and the non-display field of the right part of a liquid crystal panel 102 will become 'RD / E dots'.
[0051] Moreover, each ID has the information that the suffix -1 of a liquid crystal panel 102, -2, -3, and -4 show each ID number, the liquid crystal panel 102-1 of an ID number '1' is located in the upper left, the liquid crystal panel 102-2 of an ID number '2' is located in the upper right, the liquid crystal panel 102-3 of an ID number '3' is located in the lower left, and the liquid crystal panel 102-4 of an ID number '4' is located in the lower right.
[0052] In addition, by this example, in order to give explanation intelligible, it explains as that the display resolution (horizontal number of effective display dots = 'B dots', vertical effective display line = 'D line') to input and whose resolution of the liquid crystal panel to display correspond.
[0053] As shown in drawing 4 , when displaying the image shown in drawing 3 , the information included in the control data inputted from the outside includes the instruction which directs that each display control controls a display so that the image respectively shown in drawing 3 may serve as sector display data. Moreover, in order to specify each display control, the ID number is added to each instruction. Each display control which received this instruction sets a value as the register which a control section has as follows.
[0054] The number of dots of the location which an effective indicative data starts from Horizontal Synchronizing signal HSYNC (= 'A dots') is set to the level write-in location start register 117. The number of dots (= 'B dots') which is the number of dots of an effective indicative data is set to the level write-in width-of-face register 118. The number of lines of the location which an effective indicative data starts from Vertical Synchronizing signal VSYNC (= 'C line') is set to the vertical write-in location start register 119. The number of lines (= 'D line') which is the number of lines of an effective indicative data is set to the level write-in width-of-face register 120. moreover, this time -- the dilation ratio

(molecule) setting-out register 121 and the dilation ratio (denominator) setting-out register 122 -- said -- since twice amplification is carried out, '1' is set up for any register. Since the same viewing area of the indicative data transmitted from a system will be incorporated and read to the frame memory a110 and frame memory b111 which accompany by this each liquid crystal panel 102-1,102-2,102-3,102-4 with which setting out of ID numbers 1, 2, 3, and 4 was made, it becomes possible to obtain the same display image.

[0055] Next, the case where the enlarged display of the viewing area is divided and carried out with each liquid crystal panel of the multi-display equipment which has four indicating equipments for the image shown in drawing 5 as shown in drawing 6 is explained concretely. In drawing 6 , 102 is a liquid crystal panel and 601 is the viewing area of each liquid crystal panel 102.

[0056] The instruction which directs that each display control controls a display is included in the information included in the control data used here so that the image respectively shown in drawing 5 may serve as sector display data. Moreover, in order to specify each display control, the ID number is added to each instruction. Each display control which received this instruction sets a value as the register which a control section has as follows.

[0057] About setting out corresponding to an ID number '1' and the liquid crystal panel 102-1,102-3 of '3', the number of dots of the location where an effective indicative data starts the level write-in location start register 117 from Horizontal Synchronizing signal HSYNC (= 'A dots') is set up, and, as for the level write-in width-of-face register 118, the number of dots of the one half of the number of dots of an effective indicative data (= 'B/2 dot') is set up so that it may indicate to drawing 5 . Moreover, the value (= 'A+B / 2 dots') adding the number of dots (= 'B/2 dot') of the one half of the number of dots of the location where an effective indicative data starts the level write-in location start register 117 from Horizontal Synchronizing signal HSYNC (= 'A dots'), and the number of dots of an effective indicative data is set up about setting out corresponding to an ID number '2' and the liquid crystal panel 102-2,102-4 of '4'. Furthermore, as for the level write-in width-of-face register 118, the number of dots of the one half of the number of dots of an effective indicative data (= 'B/2 dot') is set up.

[0058] Next, about setting out corresponding to an ID number '1' and the liquid crystal panel 102-1,102-2 of '2', the number of lines of the location where an effective indicative data starts the vertical write-in location start register 119 from Vertical Synchronizing signal VSYNC (= 'C line') is set up, and, as for the vertical write-in width-of-face register 120, the number of lines of the one half of the number of lines of an effective indicative data (= 'D/2 line') is set up. Next, the value (= 'C+D / two lines') adding the number of lines (= 'D/2 line') of the one half of the number of lines of the location where an effective indicative data starts the vertical write-in location start register 119 from Vertical Synchronizing signal VSYNC (= 'C line'), and the number of lines of an effective indicative data is set up again about setting out corresponding to an ID number '3' and the liquid crystal panel 102-3,102-4 of '4'. Furthermore, as for the vertical write-in width-of-face register 120, the number of lines of the one half of the number of lines of an effective indicative data (= 'D/2 line') is set up.

[0059] And '2' is set up by the dilation ratio setting-out (molecule) register 121, and '1' is set to the dilation ratio setting-out (denominator) register 122 by the register which sets up the dilation ratio of which multi-display interface circuitry 101. It enables this for this to obtain a display image which is indicated to drawing 6 .

[0060] That is, the liquid crystal panel 102-1 of an ID number '1' The sector display data which are equivalent to an upper left screen among the indicative datas for one frame to input are displayed by 2 double amplification. The liquid crystal panel 102-2 of an ID number '2' The sector display data which are equivalent to an upper right screen among the indicative datas for one frame to input are displayed by 2 double amplification. The liquid crystal panel 102-3 of an ID number '3' Displaying the sector display data which are equivalent to a lower left screen among the indicative datas for one frame to input by 2 double amplification, the liquid crystal panel 102-4 of an ID number '4' displays the sector display data which are equivalent to a lower right screen among the indicative datas for one frame to input by 2 double amplification.

[0061] It becomes possible to carry out the enlarged display of the indicative data transmitted with the

display data bus 103 to the multi-display equipment using the liquid crystal panel 102 of four sheets by this.

[0062] Next, in the graph indicated to drawing 6 , the example which performs the display in consideration of the point whose continuity of a slanting line is lost is explained below using drawing 7 and drawing 8 .

[0063] Here, the following thing is as specifically as "a continuity is lost" pointed out. The indicative data which follows the display screen upside of the liquid crystal panel 102-3 of an ID number '3' is the form which jumped over the lower non-display field of the liquid crystal panel 102-1 of an ID number '1', and the up non-display field of the liquid crystal panel 102-3 of an ID number '3', and will be displayed on the liquid crystal panel 102-1 of an ID number '1'. Therefore, the horizontal position of the terminal point of the line displayed on the liquid crystal panel 102-3 of an ID number '3' and the horizontal position of the starting point of the line displayed on the liquid crystal panel 102-1 of an ID number '1' will be located in the almost same location, and will be in a discontinuous display condition. Similarly, the indicative data which follows the right-hand side of the display screen of the liquid crystal panel 102-1 of an ID number '1' is the form which jumped over the right-part non-display field of the liquid crystal panel 102-1 of an ID number '1', and the left part non-display field of the liquid crystal panel 102-2 of an ID number '2', and will be displayed on the liquid crystal panel 102-2 of an ID number '2'. It is being in a discontinuous display condition in the vertical position of the terminal point of the line displayed on the liquid crystal panel 102-1 of an ID number '1' and the vertical position of the starting point of the line displayed on the liquid crystal panel 102-2 of an ID number '2' being located in the almost same location.

[0064] In addition, if the pixel pitch of the liquid crystal panel 102 of this example is set to 'Emm' as explained previously, the non-display field of the upper part of a liquid crystal panel 102 will serve as a 'UD/E dot', the non-display field of the lower part of a liquid crystal panel 102 will become 'DD / E dots', the non-display field of the right part of a liquid crystal panel 102 will serve as a 'LD/E dot', and the non-display field of the right part of a liquid crystal panel 102 will serve as a 'RD/E dot'.

[0065] The different set point is set to each register of the multi-display interface circuitry 101 which accompanies each liquid crystal panel 102.

[0066] The value (= 'an A-RD/E dot') by which the number reduced property of dots of the right-hand side non-display field of a liquid crystal panel 102 (= 'a RD/E dot') was subtracted from the number of dots of the location where an effective indicative data starts the level write-in location start register 117 from Horizontal Synchronizing signal HSYNC (= 'A dots') is set up about setting out corresponding to an ID number '1' and the liquid crystal panel 102-1,102-3 of '3' so that it may indicate to drawing 7 . As for the level write-in width-of-face register 118, the number of dots of the one half of the number of dots of an effective indicative data (= 'B/2 dot') is set up. It is related with setting out corresponding to an ID number '2' and the liquid crystal panel 102-2,102-4 of '4'. Moreover, the level write-in location start register 117 The number of dots of the location which an effective indicative data starts from Horizontal Synchronizing signal HSYNC (= 'A dots'), The value (= 'A+B / 2+LD/E dot') adding the number of dots of the one half of the number of dots of an effective indicative data (= 'B/2 dot') and the number reduced property of dots of the left-hand side non-display field of a liquid crystal panel 102 (= 'a LD/E dot') is set up. Furthermore, as for the level write-in width-of-face register 118, the number of dots of the one half of the number of dots of an effective indicative data (= 'B/2 dot') is set up.

[0067] Next, the value (= 'a C-DD/E dot') by which the number reduced property of dots of the bottom non-display field of a liquid crystal panel 102 (= 'a DD/E dot') was subtracted from the number of lines of the location where an effective indicative data starts the vertical write-in location start register 119 from Vertical Synchronizing signal VSYNC (= 'C line') is set up about setting out corresponding to an ID number '1' and the liquid crystal panel 102-1,102-2 of '2'. As for the vertical write-in width-of-face register 120, the number of lines of the one half of the number of lines of an effective indicative data (= 'D/2') is set up.

[0068] Therefore, the indicative data containing the non-display data transmitted from the display data bus 103 will be written in a frame memory a110 or a frame memory b111. It is related with setting out

corresponding to an ID number '3' and the liquid crystal panel 102-3,102-4 of '4' again. Next, the vertical write-in location start register 119 The number of lines of the location which an effective indicative data starts from Vertical Synchronizing signal VSYNC (= 'C line'), The value (= 'C+D / 2+UD/E dot') adding the number of lines of the one half of the number of lines of an effective indicative data (= 'D/2 line') and the number reduced property of dots of the upside non-display field of a liquid crystal panel 401 (= 'a UD/E dot') is set up. Furthermore, as for the vertical write-in width-of-face register 120, the number of lines of the one half of the number of lines of an effective indicative data (= 'D/2') is set up.

[0069] Therefore, the indicative data containing the data of the non-display field transmitted with the display data bus 103 will be written in a frame memory a110 or a frame memory b111.

[0070] And '2' is set up by the dilation ratio setting-out (molecule) register 121, and '1' is set to the dilation ratio setting-out (denominator) register 122 by the register which sets up the dilation ratio of which multi-display interface circuitry 101.

[0071] It enables this to obtain a display image which is indicated to drawing 6 . That is, the indicative data which should be displayed on each non-display field to which a liquid crystal panel 102-1,102-2,102-3,102-4 contacts is not incorporated as sector display data by each multi-display interface circuitry 101, but since the indicative data displayed on each liquid crystal panel 102 is amended, in the graph indicated in drawing 8 , it becomes possible to acquire the continuity of a slanting line. It becomes possible to regard a display as seeing outdoor from the aperture with a sash by making it above.

[0072] Next, the 2nd example of this invention is explained using drawing 9 R> 9, drawing 10 , and drawing 11 .

[0073] Drawing 9 is the block diagram of the multi-display which realizes the 2nd example of this invention, drawing 10 is a display data format transmitted from an external system, and drawing 11 is the example of a display displayed in the 2nd example.

[0074] In drawing 9 , 901 is the multi-display interface circuitry of this invention, and 902 is a display pause register and is a register which fixes to a frame memory a110 or a frame memory b111 the frame memory which reads an indicative data. 903 is a frame memory read-out control circuit reflecting the value of this display pause register 902. About other circuits etc., since it is the same function as drawing 1 , explanation here is omitted.

[0075] In drawing 9 , the display pause register 902 has the function which fixes to a frame memory a110 or a frame memory b111 the frame memory which reads an indicative data to the frame memory read-out control circuit 903. therefore, when setting out which carries out reading appearance of the frame memory a110 to the display pause register 902, and is carried out to immobilization is made, frame memory reading appearance is carried out, and a control circuit 903 will continue carrying out reading appearance of the indicative data from a ** frame and a frame memory a110, and will continue writing the indicative data transmitted to a frame memory b111 from the display data buses 103 and 105 in the frame memory write-in control circuit 107.

[0076] when setting out which similarly carries out reading appearance of the frame memory b111 to the display pause register 902, and is carried out to immobilization is made, frame memory reading appearance is carried out, and a control circuit 903 will continue carrying out reading appearance of the indicative data from a ** frame and a frame memory b111, and will continue writing the indicative data transmitted to a frame memory a110 from the display data buses 103 and 105 in the frame memory write-in control circuit 107. Therefore, if the frame memory which reads an indicative data is fixed, even if the indicative data updated from the display data buses 103 and 105 is transmitted, it will be lost that the indicative data displayed on a liquid crystal panel 102 is updated.

[0077] and if the set point which fixes the frame memory which carries out reading appearance of the indicative data to the display pause register 902, and makes it it is canceled, since frame memory reading appearance will be carried out, a control circuit 903 and the frame memory write-in control circuit 107 will carry out reading appearance of a frame memory a110 and the frame memory a111 by turns and control and write-in control will be carried out, the indicative data displayed on a liquid crystal panel 102 can be updated.

[0078] It is attached to this actuation and the image shown in drawing 10 is more concretely explained

using the example displayed on multi-display equipment as shown in drawing 11 .
[0079] It is the display data format to which drawing 10 (a), drawing 10 (b), and drawing 10 (c) are transmitted by each from the display data bus 103 in drawing 10 , 301 and 302 of drawing 10 R> 0 (a) are the same as that of what was indicated to drawing 3 , and it is the display data format inputted from an external system, and 301 is an effective indicative data among the indicative datas transmitted, and 302 is an indicative data for one frame containing non-display data.
[0080] Drawing 10 (b) is the same, 1001 is an effective indicative data among the indicative datas transmitted, and 1002 is an indicative data for one frame containing non-display data. Drawing 10 (c) is the same, 1003 is an effective indicative data among the indicative datas transmitted, and 1004 is an indicative data for one frame containing non-display data.
[0081] In drawing 11 , 1101-1, 1101-3, and 1101-4 are the examples which displayed the indicative data given in drawing 10 (a), 1102-2 is the example which displayed the indicative data given in drawing 10 (b), and 1103-3 is the example which displayed the indicative data given in drawing 10 (c).
[0082] From introduction and the display data buses 103 and 105, the indicative data 302 given in drawing 10 (a) is transmitted. this time -- an ID number '1', '2', '3', and '4' -- all the liquid crystal panels 102 display the effective indicative data 301 given in drawing 10 (a) so that it may indicate to drawing 4 R> 4 of the 1st example of this invention. And a display pause instruction is transmitted to the multi-display interface circuitry 901 of the ID number '1' which is equivalent to a liquid crystal panel 102-1,102-3,102-4 from a control bus 132, '3', and '4'.
[0083] The microcomputer 128 of each multi-display interface circuitry 901 compares the ID number set up in ID setting-out circuit 129 with the ID number transmitted with an instruction, and only the congruous microcomputers 128 are formed for setting out of a display pause by the display pause register 902. The frame memory from which only the frame memory readout circuitry 903 of the multi-display interface circuitry 901 to which an ID number '1', '3', and '4' were set reads data by this is fixed.
[0084] Consequently, as for the display of a liquid crystal panel 102-1,102-3,102-4, a fixed indication of the effective indicative data 301 given in drawing 10 (a) is respectively given as an indicative data 1101-1, 1101-3, and 1101-4.
[0085] Next, when the indicative data 1002 given in drawing 10 (b) is transmitted from the display data buses 103 and 105, only the liquid crystal panel 102-2 which is not in a display pause condition will display the effective indicative data 1001 given in drawing 10 (b) as an indicative data 1102-2. The display condition at this time shows (a) of drawing 11 .
[0086] Moreover, a display pause instruction is transmitted to the multi-display interface circuitry 901 of the ID number '2' equivalent to a liquid crystal panel 102-2 from a control bus 132 next. The microcomputer 128 of the multi-display interface circuitry 901 compares the ID number set up in ID setting-out circuit 129 with the ID number transmitted with an instruction, and setting out of a display pause is made by the display pause register 902. The frame memory from which only the frame memory readout circuitry 903 of the multi-display interface circuitry 901 to which the ID number '2' was set reads data by this is fixed.
[0087] Consequently, as for the display of a liquid crystal panel 102-1,102-4, a fixed indication of the effective indicative data 301 given in drawing 10 (a) is respectively given as an indicative data 1101-1 and 1101-4, and, as for the display of a liquid crystal panel 102-2, a fixed indication of the effective indicative data 1001 given in drawing 10 (b) is given as an indicative data 1102-2.
[0088] In this case, an instruction of display pause discharge is transmitted to the multi-display interface circuitry 901 of the ID number '3' which is equivalent to a liquid crystal panel 102-3 from a control bus 132. The microcomputer 128 of the multi-display interface circuitry 901 compares the ID number set up in ID setting-out circuit 129 with the ID number added to the instruction included in the transmitted control data, and setting out of display pause discharge is made by the display pause register 902.
[0089] Thereby, renewal of an indicative data is carried out in the frame memory of the multi-display interface circuitry 901 to which the ID number '3' was set. That is, when the effective indicative data 1003 given in drawing 10 (c) is transmitted from the display data buses 103 and 105, only the liquid crystal panel 102-3 which is not in a display pause condition will display the effective indicative data

1003 given in drawing 10 (c) as an indicative data 1103-3. The display condition at this time is shown in (b) of drawing 11 .

[0090] As mentioned above, the 2nd example of this invention is preparing a display pause function, and it can display the indicative data from which plurality differs, without forming a display data bus for every liquid crystal panel.

[0091] Moreover, in the example of **** 2, it sets to the liquid crystal panel 102 of each ID number. The level write-in location start register 117, the level write-in width-of-face register 118, the vertical write-in location start register 119, the vertical write-in width-of-face register 120, the dilation ratio (molecule) setting-out register 121, and the dilation ratio (denominator) setting-out register 122 are the same values altogether. Although it has been made to be the same as that of the example of drawing 3 and drawing 4 , it cannot be overemphasized that the display pattern is made into adjustable in various combination, such as combination with drawing 5 and drawing 6 .

[0092] Next, the 3rd example of this invention is explained using drawing 1212 , drawing 13 , and drawing 14 .

[0093] Drawing 12 is the block diagram of the multi-display which realizes the 3rd example of this invention, drawing 13 is the display data format transmitted from the system, and drawing 14 is the example of a display displayed in the 3rd example.

[0094] In drawing 12 , 1201 is the multi-display interface circuitry of this invention, 1202 is another display data bus to which an indicative data is transmitted, and 1206 is [ 1203 is an input data processing circuit which processes the indicative data transmitted from the display data bus 1202, 1205 is an input indicative-data change register, and ] a display data bus which transmits an indicative data to the next step. About other circuits etc., since it is the same function as drawing 1 , explanation here is omitted.

[0095] In drawing 13 , drawing 13 (a) is a display data format transmitted from the display data bus 103, and drawing 13 (b) is a display data format transmitted from the display data bus 1202. In drawing 13 (a), 1301 is an effective indicative data among the indicative datas transmitted from the display data bus 103, and 1302 is an indicative data for one frame containing non-display data. Drawing 13 (b) is the same, 1303 is an effective indicative data among the indicative datas by which display data bus transfer is carried out, and 1304 is an indicative data for one frame containing non-display data.

[0096] In drawing 14 , a liquid crystal panel 102-1,102-3 is the example which displayed the indicative data 1301 given in drawing 13 (a), and 102-2,102-4 is the example which displayed the indicative data 1303 given in drawing 13 R> 3 (b).

[0097] Detailed actuation is explained about the 3rd example of this following this invention.

[0098] In drawing 9 , it enables the indicative-data change register 1205 to choose each indicative data transmitted from the display data bus 103 and the display data bus 1202. Therefore, when the indicative data transmitted with the indicative-data change register 1203 in the display data bus 103 is chosen, reading appearance of the effective indicative data 1301 given in drawing 13 (a) will be written in and carried out to a frame memory a110 or a frame memory b111, and it will be displayed on a liquid crystal panel 102. Moreover, when the indicative data transmitted with the indicative-data change register 1203 in the display data bus 1202 is chosen, reading appearance of the effective indicative data 1303 given in drawing 13 (b) will be written in and carried out to a frame memory a110 or a frame memory b111, and it will be displayed on a liquid crystal panel 102.

[0099] It enables this to choose the indicative data displayed on a liquid crystal panel 102.

[0100] This situation is explained using drawing 13 and drawing 14 . An indicative data 1302 is transmitted from the display data bus 103 so that it may indicate to introduction and drawing 13 (a). Similarly, an indicative data 1304 is transmitted from the display data bus 1202 so that it may indicate to drawing 13 (b). And the indicative-data change register 1205 in the ID number '1' indicated to drawing 1414 and the multi-display interface circuitry 1201 corresponding to the liquid crystal panel 102 of '3' chooses the indicative data 1302 from the display data bus 103 indicated to drawing 13 (a).

[0101] Similarly, the indicative-data change register 1205 in an ID number '2' and the multi-display interface circuitry 1201 corresponding to the liquid crystal panel 102 of '4' chooses the indicative data 1304 from the display data bus 1202 indicated to drawing 13 (b).

[0102] In addition, indicative-data change control is comparing with the ID number which was obtained from the control bus 132 and to which the microcomputer's 128 set the instruction which added the ID number equivalent to a liquid crystal panel 102 in ID setting-out circuit 129 like the 1st example of this invention, and the 2nd example, and will choose the corresponding display data bus.
[0103] As mentioned above, the 3rd example of this invention is preparing a display data bus change function, and has the effectiveness which can display the effective indicative data of the different source for every liquid crystal panel. Moreover, in the example of **** 3, it sets to the liquid crystal panel 102 of each ID number. The level write-in location start register 117, the level write-in width-of-face register 118, the vertical write-in location start register 119, the vertical write-in width-of-face register 120, the dilation ratio (molecule) setting-out register 121, and the dilation ratio (denominator) setting-out register 122 are the same values altogether. Although it has been made to be the same as that of the example of drawing 3 and drawing 4 , it cannot be overemphasized that the display pattern is made into adjustable in various combination, such as combination with drawing 5 and drawing 6 .
[0104] Moreover, it cannot be overemphasized that the display pattern is made into adjustable by adding the display pause function of the 2nd example.
[0105] Moreover, in the 1st example of this invention, the 2nd example, and the 3rd example, although actuation of the multi-display by the liquid crystal panel 102 of four sheets has been explained, it cannot be overemphasized that it can apply even when arranged by four (N and M are zero or more integers) or more, i.e., a MxN train.
[0106] Moreover, two or more are sufficient as the display data bus 1202 and the input data processing circuit 1203 which were mentioned above.
[0107] Next, the 4th example of this invention is explained using drawing 15 .
[0108] Drawing 15 is the multi-display system constituted from the multi-display equipment and one control device which have four indicating equipments. 1501 is a control unit and indicates a personal computer for an example. 1502 is a central processing unit and realizes various calculation functions. 1503 is main memory and stores a program etc. 1504 is network I/O, and 1505 is a network and exchanges data with the exterior. 1506 is a system bus, 1507 is a graphic controller, and 1508 is graphic memory, and to this graphic memory 1508, the data which should be displayed are written in, and a graphic controller 1507 is beginning to read them, and transmits data to an external liquid crystal multi-display. 1509 is a general-purpose I/O Port and transmits various instructions to a liquid crystal multi-display. 1510 is a display data bus and is equivalent to display data bus 103 grade given in drawing 1 . 1511, 1512, and 1513 are the display data buses by which the daisy chain was carried out, and are equivalent to display data bus 106 grade given in drawing 1 . 1514 is a control signal bus and is equivalent to control signal bus 132 grade given in drawing 1 . 1515, 1516, and 1517 are the control signal buses by which the daisy chain was carried out, and are equivalent to control signal bus 133 grade given in drawing 1 .
[0109] 1518, 1519, 1520, and 1521 are multi-display interface circuitries, and are equivalent to multi-display interface-circuitry 101 grade given in drawing 1 . 1522, 1523, 1524, and 1525 are display data buses, and are equivalent to the display data bus 116 given in drawing 1 . 1526, 1527, 1528, and 1529 are liquid crystal panels, and equivalent to the liquid crystal panel 102 given in drawing 1 . 1530 is storage.
[0110] Next, actuation of drawing 15 which is the 4th example of this invention is explained. In drawing 15 , the indicative data displayed on liquid crystal panel 1526 grade is transmitted through a network 1505. This transmitted indicative data is stored in storage 1530.
[0111] The central arithmetic circuit 1502 writes the indicative data stored in the store 1530 in the graphic memory 1508 through a graphic controller 1507 according to the program stored in main memory 1503. A graphic controller 1507 reads the indicative data written in the graphic memory 1508, and outputs it to the display data bus 1510.
[0112] Moreover, the central arithmetic circuit central arithmetic circuit 1502 transmits control data to the control signal bus 1514 through general-purpose I/O Port 1509 according to the program stored in main memory 1503. In each multi-display interface circuitries 1518, 1519, 1520, and 1521, the

indicative data of various formats will be displayed on liquid crystal panels 1526, 1527, 1528, and 1529 according to the control data to which the indicative data transmitted with the display data bus 1510 is transmitted by control signal bus 1514.

[0113] The information which the indicative data to the multi-display equipment inputted into a control device specifies respectively (namely, sector display data) is included in this control data. Moreover, the ID number which is the information which shows arrangement of each indicating equipment of the multi-display equipment of a MxN train, for example, the recognition data which each indicating equipment has, is added.

[0114] The information used for these control data is memorized by the store of an information processor, and suitable control data is generated by the data input and program from the outside, and it is transmitted to a control unit by them.

[0115] As mentioned above, it becomes possible to control simultaneously the displays 1526, 1527, 1528, and 1529 of two or more displays with one control unit 1501.

[0116] Next, the 5th example of this invention is explained using drawing 16 . Drawing 16 is an example of a system configuration at the time of using two or more multi-display systems of this invention. 1601 is the example of the multi-display equipment which constituted the liquid crystal panel from nine sheets, and 1602 is a display containing a liquid crystal panel and a multi-display interface circuitry. 1603 is multi-display equipment which constituted the liquid crystal panel from four sheets, and 1604 is a display containing a liquid crystal panel and a multi-display interface circuitry. The display resolution of a display 1602 and a display 1604 may differ in this case.

[0117] 1605 is a display data bus which transmits an indicative data to multi-display equipment 1601, and is equivalent to the display data bus 103 given in drawing 1 . 1606 is a control signal bus, has the function to transmit control data including an instruction, and is equivalent to the control signal bus 132 given in drawing 1 . 1607 is a control unit and constituting from a PC etc. is possible. 1608 is a display data bus which transmits an indicative data to multi-display equipment 1603, and is equivalent to the display data bus 103 given in drawing 1 . 1609 is a control signal bus, has the function to transmit control data including an instruction, and is equivalent to the control signal bus 132 given in drawing 1 . 1610 is a control unit and constituting from a PC etc. is possible. Daisy chain connection of the display data bus 1605, the control signal bus 1606, the display data bus 1608, and the control signal bus 1609 is made in multi-display equipment 1601 and the 1603 interior. 1611 is a network bus and 1612 is server equipment. Next, the actuation is explained.

[0118] the indicative data displayed on multi-display equipment 1601 -- beforehand -- or it is periodically transmitted to the control units 1607 and 1610 of each multi-display system through a network bus 1611 from server equipment 1612. In control devices 1607 and 1610, the transmitted indicative data is respectively transmitted to the display data buses 1605 and 1608. Under the present circumstances, the instruction according to each indicative data is transmitted to the multi-display equipments 1601 and 1603 from the control signal buses 1606 and 1609, and it becomes possible to obtain various kinds of displays.

[0119] As mentioned above, while becoming possible to control to two or more liquid crystal panel coincidence with one control units 1607 or 1610, the enlarged display doubled with the multi-display equipments 1601 and 1603 becomes possible. In addition, although here showed the example of daisy chain connection, this invention is realizable similarly with other connection methods.

[0120] Next, the 6th example of this invention is explained using drawing 17 . Drawing 17 indicates the block diagram of the substrate level of a multi-display interface circuitry, and has the composition of inputting the analog signal which is a CRT (Cathod Ray Tube) interface.

[0121] 1701, 1702, and 1704 are control signal buses, and 1703 is a hub. This is equivalent to the control data processing circuit of drawing 1 . 1705, 1707, and 1709 shall be display data buses to which an analog indicative data is transmitted, and shall include the Horizontal Synchronizing signal of a digital signal, and a Vertical Synchronizing signal. 1706 and 1708 are buffer amplifier. 1710 is a dot clock regenerative circuit -- since the dot clock which synchronized with the indicative data is not transmitted, it is necessary to input a Horizontal Synchronizing signal and to reproduce a dot clock in a

CRT (CathodRay Tube) interface

[0122] 1711 is an analog-to-digital conversion circuit, and has the function to change an analog indicative data into digital display data. 1712 is a microcomputer, and 1713 is memory, and 1714 is a multi-scan controller and contains various registers which are indicated to drawing 1 . 1715 and 1716 are frame memories and 1717 is a transceiver circuit. 1718 is a dot clock, and it is used as a clock of the multi-scan controller 1714 of operation while being applied to the sampling clock of the analog-to-digital conversion circuit 1711.

[0123] 1719 is a display data bus to which the digital display data changed by the analog-to-digital conversion circuit 1711 are transmitted. 1720 is a control bus with which a microcomputer 1712 transmits the set point to the dot clock regenerative circuit 1710. 1721 is a data bus which exchanges data between a microcomputer 1712 and memory 1713. 1722 is a data bus which exchanges data by the microcomputer 1712 and the multi-scan controller 1714. 1723 is a display data bus to which the indicative data and synchronizing signal which the multi-scan controller 1714 outputs are transmitted, and 1724 is a display data bus to which the indicative data and synchronizing signal which the transceiver circuit 1717 outputs are transmitted. 1725 is an ID number setting-out circuit, and 1726 is a data bus which transmits an ID number to a microcomputer 1712.

[0124] Actuation of this example is explained. In this example, an analog indicative data and a synchronizing signal are transmitted from the display data bus 1705. This analog indicative data transmitted is amplified through the buffer amplifier 1706, and is inputted into the analog-to-digital conversion circuit 1711. Moreover, the synchronizing signal through the buffer amplifier 1706 is inputted into the dot clock regenerative circuit 1710, and a dot clock is reproduced. In addition, this dot clock regenerative circuit 1710 can consist of phase locked loop circuits etc. Moreover, the digital display data changed by the analog-to-digital conversion circuit 1711 are inputted into the multi-scan controller 1714, and are memorized by frame memories 1715 and 1716. Reading appearance of the indicative data memorized by frame memories 1715 and 1716 is carried out by the multi-scan controller 1714, and it is outputted to a liquid crystal panel through the liquid crystal display data bus 1724.

[0125] Here, since various registers which are indicated to drawing 1 are prepared in the multi-scan controller 1714, a microcomputer 1712 is setting up the value corresponding to various registers according to the instruction included in the control data transmitted by control signal bus 1704, and various displays are attained. Moreover, the buffer amplifier 1708 will contract a transfer of the indicative data to the multi-display interface circuitry of the next step, and a hub 1703 will contract a transfer of the control data to the multi-display interface circuitry of the next step.

[0126] Implementation of a multi-display is attained by making the multi-display interface circuitry of this example correspond to each liquid crystal panel. Moreover, integration of each function shared in each circuit is attained at this appearance.

[0127] Next, the 7th example of this invention is explained using drawing 18 . Drawing 18 indicates the block diagram of the substrate level of a multi-display interface circuitry, and has the composition of receiving a digital indicative data direct. 1801 is a display data bus, 1802 is a receiver circuit, 1803 is a display data bus, 1804 is a transceiver circuit, and 1805 is a display data bus. The display data buses 1801, 1803, and 1805 contain digital display data, the Horizontal Synchronizing signal, the Vertical Synchronizing signal, the display valid signal, and the dot clock. 1806 is a dot clock. 1807 is digital display data.

[0128] Actuation of this example is explained. In this example, since digital display data, a Horizontal Synchronizing signal, a Vertical Synchronizing signal, a display valid signal, and a dot clock are transmitted from the display data bus 1801, the analog-to-digital conversion circuit 1711 grade indicated in the example 6 of drawing 17 becomes unnecessary. Moreover, the receiver circuit 1804 will contract a transfer of the indicative data to the multi-display interface circuitry of the next step.

[0129] In addition, since other actuation in this example turns into the same actuation as the 6th example given in drawing 17 , it omits explanation. By considering as such a configuration, application becomes possible also at the system which transmits digital display data.

[0130] Next, the 8th example of this invention is explained using drawing 19 . Drawing 19 is an

example of a system configuration at the time of using the multi-display of this invention with equipment. 1901 is a control unit and constituting from a PC etc. is possible. 1902 is a control signal bus and transmits control data including an instruction.

[0131] This example is the configuration of the form where the control device which outputs an indicative data, and the control device which outputs control data were separated. that is, the indicative data displayed on multi-display equipment 1601 -- beforehand -- or it will be periodically transmitted to a control device 1607 through a network bus 1611 from server equipment 1612, and control data will be transmitted to multi-display equipment 1601 from a control device 1901.

[0132] Remote operation becomes [ the control device which outputs control data ] possible, even when the control device and the multi-display equipment 1601 which output an indicative data adjoin and are installed by this.

[0133] Next, processing of the instruction about the actual size display of drawing 4 R> 4 indicated in the 1st example of this invention, the amendment non-enlarged display of drawing 6 , and the amendment owner enlarged display of drawing 8 is explained using the flow chart of drawing 20 . 2001 is the command transmission which a control device publishes, and is transmitted through the control signal bus 132 given in drawing 1 . 2002 is command reception and the ID number contained in the instruction with which 2003 is transmitted judges whether it corresponds to this multi-scan interface circuitry. 2004 judges whether it is actual size amplification given in drawing 4 , 2005 judges whether it is an amendment display non-enlarged display given in drawing 6 , and it means that 2006 is an amendment display owner enlarged display given in drawing 8 .

[0134] 2007 is what showed the actuation which reads the set point from the data storage memory 130 given in drawing 1 , 2008 shows the actuation which reads the set point of actual size amplification given in drawing 4 , 2009 shows the actuation which reads the set point of an amendment display non-enlarged display given in drawing 6 , and the actuation read in the set point of an amendment display owner enlarged display given in drawing 8 is shown in 2010. 2011 is setting out to each register, 2012 is the reply of setting out 'O.K.', 2013 shows that a control unit receives setting out 'O.K.' transmitted through the control signal bus 132, and 2014 means termination.

[0135] Next, actuation is explained. In a multi-display interface circuitry, an ID number is checked first, when it corresponds, the judgment of an actual size display, an amendment non-enlarged display, and an amendment owner enlarged display is performed, the set point which corresponds from the data storage memory 130 is read based on the judgment result, and setting out to each register is carried out. And after setting out is completed, the command of setting out 'O.K.' is transmitted to a control unit, and a series of actuation is made to complete. By making it this appearance, the multi-display display of various display formats is attained.

[0136] In addition, it cannot be overemphasized that it is easily realizable by adding the criteria of a command to drawing 9 and drawing 12 on this flow chart also about the function which carried out the additional publication.

[0137] In addition, this invention can also take the following configurations.

[0138] In the multi-display equipment which has two or more indicating equipments which input an indicative data as a liquid crystal panel, and display an indicative data on this liquid crystal panel an indicating equipment The means written in a frame memory, the means which reads the indicative data memorized to the frame memory, and when reading from a frame memory, Or a means to perform amplification processing to which an indicative data is made to increase after reading, A means to direct the horizontal write-in starting position of an indicative data written in a frame memory, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, A means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory, Multi-display equipment characterized by having the microcomputer which sets a value as this each means, the ID number prepared for this every display, and the control signal which transmits an instruction to said microcomputer, and constituting said display or more from two.

[0139] Moreover, a means to direct the horizontal write-in starting position of an indicative data written in a frame memory in said multi-display equipment, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, Multi-display equipment characterized by setting up the same value as a means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory, and displaying the same indicative data with two or more indicating equipments.
[0140] Furthermore, the multi-display equipment which sets up a different value for every indicating equipment from a means direct the horizontal write-in starting position of an indicative data written in a frame memory in said multi-display equipment, a means direct the horizontal write-in width of face written in a frame memory, a means direct the write-in starting position of the perpendicularly it writes in a frame memory, and a means direct the write-in width of face of the perpendicularly it writes in a frame memory, and is characterized by to display the indicative data of a different viewing area.
[0141] Moreover, it is multi-display equipment characterized by setting the next dot location of the last dot which the adjoining display incorporated the display concerned when a display continued horizontally in said multi-display equipment, and was displayed as a means to direct a horizontal write-in starting position.
[0142] Furthermore, it is multi-display equipment characterized by setting the next line location of the last line which the adjoining display incorporated the display concerned when a display continued perpendicularly in said multi-display equipment, and was displayed as a means to direct a vertical write-in starting position.
[0143] Moreover, multi-display equipment characterized by setting a dilation ratio as a means to direct the dilation ratio of the indicative data read from said frame memory, and performing an enlarged display in said multi-display equipment in case indicative datas fewer than the display resolution of a liquid crystal panel are displayed.
[0144] Furthermore, it is multi-display equipment characterized by to set the dot location which added said a dots to the last dot location of the field which the adjoining display incorporated the display concerned when the number of dots equivalent to the non-display field of right and left of a liquid crystal panel or the non-display field of one of right and left was made into a dots in said multi-display equipment and a display continued horizontally, and was displayed as a means direct a horizontal write-in starting position.
[0145] Moreover, it is multi-display equipment characterized by to set the line location which added said b lines to the last line location of the field which the adjoining display incorporated the display concerned when the number of dots equivalent to the non-display field of right and left of a liquid crystal panel or the non-display field of one of right and left was made into b lines in said multi-display equipment and a display continued perpendicularly, and was displayed as a means direct a vertical write-in starting position.
[0146] In the multi-display equipment which has two or more indicating equipments which input an indicative data as a liquid crystal panel, and display an indicative data on this liquid crystal panel or an indicating equipment The means written in a frame memory, the means which reads the indicative data memorized to the frame memory, and when reading from a frame memory, Or a means to perform amplification processing to which an indicative data is made to increase after reading, A means to direct the horizontal write-in starting position of an indicative data written in a frame memory, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, A means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory, Multi-display equipment characterized by having a means to fix the frame memory which reads an indicative data, the microcomputer which sets a value as this each means, the ID number prepared for this every display, and the control signal which transmits an instruction to said microcomputer, and constituting this display or more from two.
[0147] Moreover, a means to direct the horizontal write-in starting position of an indicative data written

in a frame memory in said multi-display equipment, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, Multi-display equipment characterized by setting up the same value as a means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory, and displaying the same indicative data with two or more indicating equipments.

[0148] Furthermore, the multi-display equipment which sets up a different value for every indicating equipment from a means direct the horizontal write-in starting position of an indicative data written in a frame memory in said multi-display equipment, a means direct the horizontal write-in width of face written in a frame memory, a means direct the write-in starting position of the perpendicularly it writes in a frame memory, and a means direct the write-in width of face of the perpendicularly it writes in a frame memory, and is characterized by to display the indicative data of a different viewing area.

[0149] Moreover, multi-display equipment which makes immobilization the frame memory which reads an indicative data or more for one of said two or more indicating equipments, and is characterized by indicating the 1st indicative data and the 2nd indicative data by mixture in said multi-display equipment by transmitting the 2nd indicative data to said two or more indicating equipments after that when the 1st indicative data is displayed on two or more indicating equipments.

[0150] In the multi-display equipment which has two or more indicating equipments which input an indicative data as a liquid crystal panel, and display an indicative data on this liquid crystal panel or an indicating equipment A means to input two or more indicative datas, and a means to choose two or more indicative datas, The means written in a frame memory, the means which reads the indicative data memorized to the frame memory, and when reading from a frame memory, Or a means to perform amplification processing to which an indicative data is made to increase after reading, A means to direct the horizontal write-in starting position of an indicative data written in a frame memory, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, A means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory, Multi-display equipment characterized by having the microcomputer which sets a value as this each means, the ID number prepared for this every display, and the control signal which transmits an instruction to said microcomputer, and constituting this display or more from two.

[0151] Moreover, a means to direct the horizontal write-in starting position of an indicative data written in a frame memory in said multi-display equipment, A means to direct the horizontal write-in width of face written in a frame memory, and a means to direct the write-in starting position of the perpendicularly it writes in a frame memory, The same value as a means to direct the write-in width of face of the perpendicularly it writes in a frame memory, and a means to direct the dilation ratio of the indicative data read from the frame memory is set up. It is multi-display equipment characterized by for one or more indicating equipments displaying one indicative data between two or more input indicative datas, and one or more indicating equipments displaying another indicative data.

[0152] Or it is multi-display equipment which equips one control unit with two or more indicating equipments, and is characterized by ****** which displays the screen where each indicating equipments differ.

[0153] Moreover, it is multi-display equipment which one control device is equipped with two or more indicating equipments, and said control device and said indicating equipment are connected by one display data bus and one control signal bus, and is characterized by displaying an indicative data which is different in said indicating equipment.

[0154] Moreover, multi-display equipment characterized by expressing the indicative data for one screen transmitted from one control device in two or more indicating equipments as said multi-display equipment ranging over two or more indicating equipments.

[0155] Furthermore, multi-display equipment characterized by not displaying the indicative data which the indicative data for one screen transmitted from one control device is expressed as said multi-display

equipment in two or more indicating equipments ranging over two or more indicating equipments, and corresponds to the non-display field of eye a bond of said indicating equipment.

[0156]

[Effect of the Invention] According to this invention, it is effective in it being cheap and being able to offer a multi-display system with one control unit, since it becomes possible to display various formats on two or more liquid crystal panels.

[0157] Moreover, according to the example of this invention, it is effective in a dynamic image being made as for the display of various formats to two or more liquid crystal panels with one control unit.

[0158] Moreover, according to this invention, it is, It becomes possible to constitute the multi-display system which does not need the complicated activity of processing an indicative data from a control-device side.

[0159] Moreover, since a means to display one indicative data continuously is established ranging over two or more indicating equipments, it is the distribution side of an indicative data, and it is not necessary to do the activity and there is effectiveness which can constitute a user-friendly multi-display system.

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[Translation done.]